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ABSTRACT

In trying to help students pass the Texas Academic Skills Program (TASP) Examination, changes have been found to occur in the student before efforts at teaching mathematics are effective. A literature review was conducted to seek a philosophical basis to support theories of helping learners. Various learning theories was searched and found that they all lack the need to develop learners. It was found that the learner first must undergo a fundamental change in attitude toward mathematics and ability to acquire the requisite knowledge of mathematics in order to pass the TASP Examination. This paper offers some suggestions, tips, and strategies that have been acquired from experience in working with TASP-responsible students. (Author/SOE)

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PASSING THE MATHEMATICS SECTION OF THE TASP: STRATEGIES, TIPS, AND SUGGESTIONS

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Passing the Mathematics Section of the TASP: Strategies, Tips, and Suggestions

Abstract

From our work in trying to help students pass the TASP Examination, we have found the following changes have to occur in the student before our efforts at teaching Mathematics are effective. We have gone to the literature to seek a philosophical basis to support our theories of helping the learners. We have looked at various learning theories and found them lacking in our need to develop the learners. What we have found is that the learner first must undergo a fundamental change in his or her attitude toward mathematics and his or her ability to acquire the requisite knowledge of mathematics to pass the TASP Examination. Offered are some suggestions, tips and strategies that we have acquired over our experience in working with TASP responsible students.

From our work in trying to help students pass the TASP Examination, we have found the following changes have to occur in the student before our efforts at teaching Mathematics are effective. We have gone to the literature to seek a philosophical basis to support our theories of helping the learners. We have looked at various learning theories and found them lacking in our need to develop the learners. What we have found is that the

learner first must undergo a fundamental change in his or her attitude toward mathematics and his or her ability to acquire the requisite knowledge of mathematics to pass the TASP Examination.

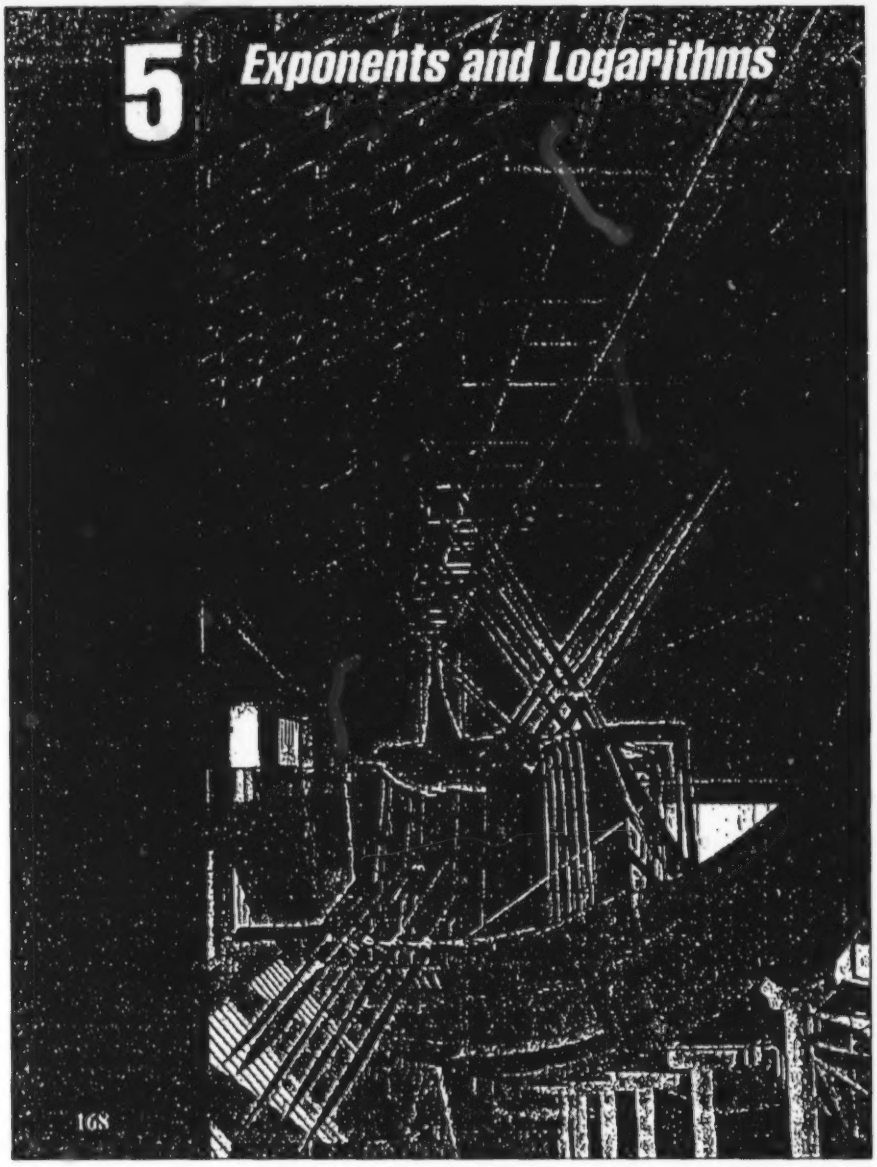
First, our students have had a negative experience with the TASP. They have failed at least one or more times when we meet them. Therefore, one of the first things we try to change in them is the notion that there is something wrong with failure. We try to show them the good points about failure. Just like a popular song says, "Get up and dust yourself off again" or as we were taught "when you fall in the mud don't just lie there, get up and clean yourself off." One of the many metaphors used in the literature concerning this subject is about teaching a small child to walk requires overcoming many failures. When the child falls she gets up off the floor each time she falls and repeats the process until she learns to walk. We try to stress that the only true failure comes from the failure to try. We try to stress that growth comes out of failure and with our help you can pass the TASP.

Douglas McGregor, the motivation expert, stated:

Management by direction and control-whether implemented with the hard, the soft, or the firm but fair

approach-fails under today's conditions to provide effective motivation of human effort toward organizational objectives. It fails because direction and control are useless methods of motivating people whose physiological and safety needs are reasonably satisfied and whose social, egoistic, and self-fulfillment needs are predominant.

So, what we try to do is encourage the learners of there abilities to pass this examination from a historical or cultural perspective. We try to establish a connection with the past. If need be we go back to Africa.



Ancient Egyptian astronomers used geometry to predict the future position of stars and planets. Current archeologists use

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mathematics to explore the Egyptian past. Exponential functions, for instance, are used in the carbon dating of ancient artifacts, such as this ceremonial boat dating from the reign of King Cheops, around 2400 B.C.

Or,

Africa About 1650 B.C., a scribe named A'h-mose' lived in Egypt. This scribe wrote and also embellished older works of mathematics. Modern scholars refer to this scribe as Ahmes. The Ahmes Papyrus is one of the oldest mathematical documents in existence. Among other mathematical topics, it contains the first references to arithmetic series. The papyrus was purchased in Egypt by English Egyptologist A. Henry Rhind in the mid-19th century. Some scholars today refer to this historical artifact as the Rhind Papyrus. It was later acquired by the British Museum. (Advanced Mathematical Concepts, p. 652)

Or,

Egypt The slopes of ancient Egyptian Pyramids vary with their location. Scientists have concluded that pyramids were sloped for the particular latitude of their location. The shadow patterns were used to measure the length of a year. A level shadow-floor

was found on the north side of the Great Pyramid. The paving blocks were cut in widths very near to the measurement by which the noontime shadows were used to plot the movement of the sun over the years. From this, ancient priests determined the exact length of a year to within 6 hours. (Advanced Mathematical Concepts, p. 2)

Or,

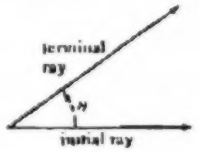
Angles, Arcs, and Sectors

7-1 Measurement of Angles

Objective *To find the measure of an angle in either degrees or radians and to find coterminal angles.*

The word *trigonometry* comes from two Greek words, *trigonon* and *metron*, meaning "triangle measurement." The earliest use of trigonometry may have been for surveying land in ancient Egypt after the Nile River's annual flooding washed away property boundaries. In Chapter 9 we will discuss this use of trigonometry in greater detail. In Chapter 8 we will discuss more modern applications of trigonometry, such as the analysis of radio waves. The foundation for these applications is laid in this chapter, where we discuss the definitions and properties of the trigonometric functions.

In trigonometry, an angle often represents a rotation about a point. Thus, the angle θ shown is the result of rotating its *initial ray* to its *terminal ray*.



A common unit for measuring very large angles is the **revolution**, a complete circular motion. For example, when a car with wheels of radius 14 in. is driven at 35 mi/h, the wheels turn at an approximate rate of 420 revolutions per minute (abbreviated rpm).

A common unit for measuring smaller angles is the **degree**, of which there are 360 in one revolution. For example, when a door is opened, the doorknob is usually turned $\frac{1}{4}$ revolution, or 90 degrees.

The convention of having 360 degrees in 1 revolution can be traced to the fact that the Babylonian numeration system was based on the number 60. One theory suggests that Babylonian mathematicians subdivided the angles of an equilateral triangle into 60 equal parts (eventually called degrees). Since six equilateral triangles can be arranged within a circle, 1 revolution contained $6 \times 60 = 360$ degrees.

Angles can be measured more precisely by dividing 1 degree into 60 **minutes**, and by dividing 1 minute into 60 **seconds**. For example, an angle of 25 degrees, 20 minutes, and 6 seconds is written $25°20'6''$.

Angles can also be measured in decimal degrees. To convert between decimal degrees and degrees, minutes, and seconds, you can reason as follows:

$$12.3° = 12° + 0.3(60)' = 12°18'$$

$$25°20'6'' \quad 25° + \left(\frac{20}{60}\right)° + \left(\frac{6}{3600}\right)° \quad 25.335°$$

◀ Swiftly falling water propels this water wheel. Can you see how the radius of the wheel and the speed of the water determine the speed of revolution of the shaft of the water wheel?

Where we try explain such words as trigonometry. The word comes from two Greek words, "trigonon" and "metron," meaning "triangle measurement." The earliest use of trigonometry

may have been for surveying land in ancient Egypt after the Nile River's annual flooding washed away property boundaries.

Alternatively, we employ Maslow's hierarchy of needs research to our quest of helping the learner pass the TASP.

Maslow's Hierarchy of Needs

LEVEL OF NEEDS	BASIC NEED
Level Five	Self-Actualization Needs
Level Four	Esteem Needs
Level Three	Belonging and Love Needs
Level Two	Safety Needs
Level One	Physiological Needs

When we work with groups of students we work to establish Maslow's Level Two need of "Safety" and Level Three needs of "Belonging and Love needs". We utilize the work of Edgar Schein, "First of all we have to provide for their psychological safety, a sense that learning something new will not cause loss of identity or their sense of competence. We take care to not embark on a path that may be perceived to be destructive to their sense of self-worth." We create a psychologically safe environment by making guidelines known to all participants and then making sure that all members of the group follow the

guidelines. These guidelines, although unique to each group generally contain the following:

GUIDELINES FOR A SAFE ENVIRONMENT

- We are a sharing group.
- We work together to construct a safe environment.
- We do not make critical statements of one another. We speak in "I" statements, not "you" statements.
- We offer advice only when requested by a member.
- We make every effort to support one another's efforts to change and construct change.
- We support each person's right to speak or to refrain from speaking.
- We recognize the importance of spontaneity.
- We do not interrupt others; we honor their right to speak.
- We respect one another by giving our full attention to each person's comments.

Individually or with a group, we work extra hard to develop the learners need for esteem. If we can successfully raise the learners self esteem need we realize that we can motivate the learn to acquire the requisite mathematics skills to do well on the TASP.

We discuss with them Freud's three ego states of the Id, Ego, and Super-ego. We connect the "super-ego" to the parent or

to us in this case. We let the learner know of our belief in them and our belief that we give them the right to pass the TASP Examination. Kurt Lewin, the psychologist, stated: "Only if and when the new set of values is freely accepted, only if it corresponds to one's super-ego, do those changes and social perception occur which, as we have seen, are a prerequisite for a change in conduct and therefore for a lasting effect of re-education." Our values and beliefs determine our sense of identity. Because we identify so closely with our personal sets of beliefs and values, we respond defensively when these beliefs and values are questioned. We believe that discarding these beliefs and values leaves us vulnerable. Therefore, we (Dr. Ginn and North) go so far as to say to them that they can pass the examination because we say that they can. We use this technique to instill confidence in our learners and to help them raise their self-esteem. We try to remove any unrealistic fear or self-doubt from the student by having them to transfer their unrealistic fear or self-doubt to us.

Eric Fromm states: "A personality and an organization are both systems that is to say it's not just a sum total of many parts, but it is a structure. If one part of the structure is changed it

touches on all other parts. The structure in itself has a cohesion; it tends to reject changes because this structure itself tends to retain itself."

Most of these learners that we help, come to us with the baggage of Skinnerian thinking, "one-dimensional thinking of cause-and-effect". Obviously, these learners perceive that they are not smart enough to pass the TASP Test. The reward system of the schools have missed them or have at least not been effective for them. These students have already received the threat of failure, placement in non-stimulating classes, non-promotion, and non-graduation. What we try to accomplish with these students is to use a multidimensional approach to change the way they perceive their situation. We recognize that each learner brings a panoply of reasons why he or she did not make the necessary score required to pass the test. We try to grasp from the learner the various interrelationships aspects that may be attributing to their lack of passage rather than linear cause-effect chains, and seeing processes of change rather than snapshots." On some occasions we have found that poor vision is problem.

Story Sharing

Is an overlooked but essential part of creating conditions for acceptance and is communal in nature. Dolly Haik-Adams Berthelot, story sharing consultant, states:

> Since the most primitive campfires and throughout history, stories have helped teach, influence, and bind people together. Stories have fostered the understanding-of self, of others, and of life-which is vital to progress. Such understanding is sorely needed today, as we struggle to live and work together and progress toward common goals.

The story sharing process is a synergistic event that enhances creativity, collegiality, and community. Through this process, learners identify with one another. Each learner recognizes that stories, although unique, share common patterns. They recognize that the suffering associated with change is common and shared. In essence, story sharing becomes a healing and liberating experience for the group.

In conclusion, knowledge alone, however, is not sufficient to maintain the change process. Kurt Lewin, the industrial psychologist, tells us that in addition to knowledge, the structure has to support the desire to change. In essence, the person and the structure interactively work together to create the conditions for change, implement the change, and sustain the change. The success

of the change relates directly to the person's active involvement in the actual planning and carrying out of the changes. Once the desire is present, the learner readily adapts to obtaining the requisite skills and knowledge needed to pass the TASP Examination. Usually the learners then work with us and takes charge in maximizing his or her studies in order to pass the TASP Examination.

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